Numericals

CLASS: 9th / 10th

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MITHA TIWANA

WEIGHT GHT AGAINST 1

NUMERICAL:9
CHAPPTER # 01
Exp: 1, 2, 4

(a) 5000g   **1.1**
$= 5 \times 10^3 g$
$= 5kg$

(b) 2000000W
$= 2 \times 10^6 W$
$= 2MW$

(c) $52 \times 10^{-10} kg$
$= 52 \times 10^{-10} \times 10^3 g$
$= 52 \times 10^{-7} g$
$= 5.2 \times 10^{-6} g$
$= 5.2ug$

(d) $225 \times 10^{-10} s$
$= 2.25 \times 10^{-6} s$
$= 2.25us$ **1.2**

$1p = 10^{-12}$ / $1n = 10^{-9}$
$1u = 10^{-6}$ / $1u = 10^3 n$
$1n = 10^3$ / $1u = 10^6 p$

بال بڑھنے کی شرح   **1.3**
$= V = d/t$
$= 1mm/1\ day$
$= 1 \times 10^{-3}/86400$
$= 1.157 \times 10^{-5} \times 10^{-3}$
$= 1.157 \times 10^{-8}$
$= 11.57 \times 10^{-9}$
$= 11.57 nm/s$

(a) 1168×10^{-27} **1.4**
$= 1.168 \times 10^{-27+3}$
$= 1.168 \times 10^{-24}$

(b) 32×10^5
$= 3.2 x^{5+1}$
$= 3.2 \times 10^6$

(c) $725 \times 10^{-5} kg$
$= 725 \times 10^{-5} \times 10^3 g$
$= 725 \times 10^{-2} g$
$= 7.25g$

(d) 0.02×10^{-8}
$= 2 \times 10^{-8-2}$
$= 2 \times 10^{-10}$

(a) 6400km   **1.5**
$= 6.4 \times 10^3 km$

(b) 380000km
$= 3.8 \times 10^5 km$

(c) 300000000m/s
$= 3 \times 10^8 m/s$

(d) = ایک دن میں سیکنڈ
$24 \times 60 \times 60 s$
$= 86400s$
$= 8.64 \times 10^4 s$

$= 0.01 \times 4$ **1.6** زیرو ایرر

$= 0.04cm$
$-0.04cm$ = زیرو کوریکشن
$= 50$ درجوں کی تعداد   **1.7**
$= 0.5mm$ سکریو کی پچ
$L.C =$ درجہ/پچ
$= 0.5/50$
$= 0.01cm$

$0.00309kg = 3$ **1.8**
$5.05 \times 10^{-27} = 3$
$1.009m = 4$ **1.9**
$0.00450kg = 3$
$1.66 \times 10^{-27} kg = 3$
$2001s = 4$

لمبائی $= 6.7cm$ **1.10**
چوڑائی $= 5.4cm$
رقبہ $= L \times W = 6.7 \times 5.4$
$= 36.78cm^2$
$= 36cm^2$

CHAPPTER # 02
Exp: 2,3,4,5,10,1?

$V = 36km/h$ **2.1**
$= 36 \times 1000m/3600$
$V = 10m/s$
$t = 10s$
$S = V \times t$
$= 10 \times 10$
$= 100m$

$V_i = 0$ **2.2**
$S = 1000m$
$t = 100s$
$V_f = ?$
$S = V_i t + \frac{1}{2}at^2$
$10^3 = 0 \times 100 + \frac{1}{2}a \times a \times (100)^2$
$a = 0.2m/s^2$
$V_f = V_i + at$
$= 0 + 0.2 \times 100$
$= 20m/s$

$V_i = 10m/s$ **2.3**
$a = 0.2m/s^2$
$t = 30s$
$S = ?$
$V_f = ?$
$V_f = V_i + at$
$= 10 + 0.2 \times 30$
$= 10 + 6 = 16m/s$
$S = V_i t + \frac{1}{2} at$
$= 10 \times 30 + \frac{1}{2}0.2(30)^2$
$= 300 + \frac{1}{2}0.2 \times 900$
$= 300 + 90$
$= 390m$

$V_i = 30m/s$ **2.4**

$V_f = 0$
$g = -10m/s^2$
$h = ?$
$2gh = V_f^2 - V_i^2$
$2(-10)h = (0)^2 - (30)^2$
$-20h = -900$
$h = -900/-20$
$h = 45m$
واپسی کا ٹائم $= t = 3s$

پانچ سیکنڈ میں طے فاصلہ   **2.5**
$V_i = 40m/s$
$t = 5s$
$S_1 = V \times t$
$S_1 = 40 \times 5$
$= 200m$

دس سیکنڈ میں طے فاصلہ
$V_i = 40m/s$
$V_f = 0$
$t = 10s$
$V_{av} = V_f + V_i/2$
$= 0 + 40/2$
$= 20m/s$
$S_2 = V \times t$
$S_2 = 20 \times 10$
$= 200m$

کل فاصلہ $= S_1 + S_2$
$= 200 + 200$
$= 400m$

ڈسلریشن
$a_{av} = V_f - V_i/t$
$= 0-40/10 = -40/10$
$= -4m/s^2$

$V_i = 0$ **2.6**
$a = 0.5m/s^2$
$S = 100m$
$V_f = ?$
$2aS = V_f^2 - V_i^2$
$2(0.5)100 = V_f^2 - (0)^2$
$V_f^2 = 100$
$V_f = 10m/s^2$
$V_f = 10 \times 3600/1000$
$V_f = 36km/h$

دو منٹ میں طے فاصلہ   **2.7**
$V_i = 0$
$V_f = 48km/h$
$= 13.33m/s$
$t = 2mint = 2 \times 60$
$= 120s$
$V_{av} = V_f - V_i/2$
$= 0 + 13.33/2$
$= 6.66m/s$
$S_1 = V_{av} \times t$
$= 6.66 \times 120$

$= 800m$
پانچ منٹ میں طے فاصلہ
$V = 13.33m/s$
$t = 5mint = 5 \times 60$
$= 300s$
$S_2 = V \times t$
$= 13.66 \times 300$
$= 4000m$

تین منٹ میں طے فاصلہ
$V_i = 13.66m/s$
$V_f = 0$
$t = 3mint = 3 \times 60$
$= 180s$
$V_{av} = V_f + V_i/2$
$= 0 + 13.66/2$
$= 6.66m/s$
$S_3 = V_{av} \times t$
$= 6.66 \times 180$
$= 1200m$

کل فاصلہ $= S_1 + S_2 + S_3$
$= 800 + 4000 + 1200$
$= 6000m$

اوپر جانے کا وقت   **2.8**
$t = 6/2 = 3s$
$g = -10m/s^2$
$V_f = 0$
$h = ?$
$V_i = ?$
$V_f = V_i + gt$
$0 = V_i + (-10) \times 3$
$V_i = 30m/s$
$2gh = V_f^2 - V_i^2$
$2(-10)h = (0)2 - (30)2 - 20 \times h = -900$
$h = -900/-20$
$= 45m$

$S = 800m$ **2.9**
$V_i = 96km/h$
$= 26.67m/s$
$V_f = 48km/h$
$= 13.33m/s$
$a = ?$
$2aS = V_f^2 - V_i^2$
$2a800 = (13.33)^2 - (26.67)^2$
$1600a = 177.68 - 711.28$
$a = -533.6/1600$
$= -0.3335m/s^2$

اس ایکسلریشن سے طے فاصلہ
$V_i = 13.33m/s$
$V_f = 0$
$a = -0.3335m/s^2$
$S = ?$
$2aS = V_f^2 - V_i^2$
$2(-0.3335)S = (0)^2 - (13.33)^2$
$0.667 \times S = -177.66$

$S = -177.66/-0.667$
$S = 266.4m$
$V_i = 26.67m/s$ **2.10**
$V_f = 0$
$a = -0.3335m/s^2$
$V_f = V_i + at$
$t = V_f-V_i/a$
$t = 0-26.67/-0.3335$
$t = 80s$

CHAPPTER # 03
Exp: 1, 2, 3, 6, 7, 8
$F = 20N$ **3.1**
$a = 2m/s^2$
$F = ma$
$m = F/a$
  $= 20/2$
  $= 10kg$

$W = 147N$ **3.2**
$g = 10m/s^2$
$W = mg$
$m = W/g$
  $= 147/10$
  $= 14.7kg$

$m = 10kg$ **3.3**
$g = 10m/s^2$
$W = mg \rightarrow F$
  $= 10x10$
  $= 100N$

$F = 100N$ **3.4**
$m = 50kg$
$F = ma$
$a = F/m$
  $= 100/50$
  $= 2m/s^2$

$W = 20N$ **3.5**
$a = 2m/s^2$
$g = 10m/s^2$
$W = mg$
$m = W/g$
  $= 20/10$
  $= 2kg$
$F = ma$
  $= 2x2 = 4N$
ساری فورس = W+F
$F = 20+4$
  $= 24N$

$m_1 = 52kg$ بڑا ماس **3.6**
$m_2 = 48kg$ چھوٹا ماس
$g = 10m/s^2$
$a = \dfrac{(m_1-m_2)g}{m_1+m_2}$
$=(52-48)x10/52+48$
$= 4x10/100=40/100$

$a = 0.4m/s^2$
$T = \dfrac{2m_1m_2g}{m_1+m_2}$
$= 2x52x48x10/100$
$= 49920/100$
$T = 500N$

$m_1 = 24k$ اسکا ہوا ماس **3.7**
$m_2 = 26kg$ سٹے پر چڑا ماس
$g = 10m/s^2$
$a = \dfrac{m_1g}{m_1+m_2}$
  $= 24x10/24+26$
$a = 240/50$
  $= 4.8m/s^2$
$T = \dfrac{m_1m_2g}{m_1+m_2}$
$=24x26x10/24+26$
$T = 6240/50$
  $= 125N$

$\Delta P = 22Ns$ **3.8**
$F = 20N$
$F = \Delta P/t$
$t = \Delta P/F$
  $= 22/20$
$t = 1.1s$

$m = 5kg$ **3.9**
$\mu = 0.6$
$F_s = \mu F = \mu mg$
$F_s = 0.6x5x10$
  $= 30N$

$m = 0.5kg$ **3.10**
$r = 50cm$
$r = 50/100$
  $= 0.5m$
$V = 3m/s$
$F_c = mV^2/r$
  $= 0.5x(3)^2/0.5$
  $= 9N$

CHAPPTER # 04
Exp: 1, 2, 5
$F_x = 10-4 = 6N$ **4.1**
$F_y = 6N$
$F = \sqrt{F_x^2 + F_y^2}$
$F = \sqrt{6^2 + 6^2}$
$F = \sqrt{72} = 8.5N$
$\theta = tan^{-1}(F_y/F_x)$
$\theta = tan^{-1}(6/6)$
$\theta = tan^{-1}(1)$
  $= 45^0$

$F = 50N$ **4.2**
$\theta = 30^0$
$F_x = Fcos\,\theta$
  $= 50cos30^0$

  $= 50x0.866$
  $= 43.3N$
$F_y = Fsin\,\theta$
  $= 50sin30^0$
  $= 50x0.5$
  $= 25N$

$F_x = 12N$ **4.3**
$F_y = 5N$
$F = \sqrt{F_x^2 + F_y^2}$
$F = \sqrt{12^2 + 5^2}$
$F = \sqrt{169} = 13N$
$\theta = tan^{-1}(F_y/F_x)$
$\theta = tan^{-1}(5/12)$
  $= 22.6^0$

$F = 100N$ **4.4**
$r = 10cm = 0.1m$
$\tau = rF$
  $= 0.1x100$
  $= 10Nm$

$F_x = 20N$ **4.5**
$\theta = 30^0$
$F_x = Fcos\,\theta$
$F = F_x/cos\,\theta$
  $= 20/cos30^0$
  $= 20/0.866$
  $= 23.1N$

$F = 50N$ **4.6**
$r = 16cm = 0.16m$
کپل کا ٹارک
  $= 2rF$
  $= 2x0.16x50$
  $= 16Nm$

$T_1 = 3.8N$ **4.7**
$T_2 = 4.4N$
$W = T_1 + T_2$
  $= 3.8+4.4$
  $= 8.2N$

$m_1 = 3kg$ **4.8**
$m_2 = 5kg$
$T_1 = mg$
  $= 3x10$
  $= 30N$
$T_2 = (m_1+m_2)g$
  $= (3+5)x10$
  $= 80N$

$F_1 = 200N$ **4.9**
$r_1 = 20cm = 0.2m$
$F_2 = 150N$
$r_2 = ?$
$\tau_1 = \tau_2$
$F_1r_1 = F_2r_2$
$r_2 = F_1r_1/F_2$
  $= 0.1x200/150$

  $= 0.133m$
  $= 13.3cm$
$m = 10kg$ **4.10**
$F_1 = mg$
$F_1 =10x10 = 100N$
$r_1 = 20cm = 0.2m$
$r_2 = 50cm = 0.5m$
$F_2 = ?$
اتنی کلاک وائز = کلاک وائز ٹارک
$F_2r_2 = F_1r_1$
$F_2 = F_1r_1/r_2$
  $= 100x0.2/0.5$
  $= 20/0.5$
  $= 40N$

CHAPPTER # 05
Exp: 1, 2
$m_1 = 1000kg$ **5.1**
$m_2 = 1000kg$
$d = 0.5m$
$G = 6.67x10^{-11} Nm^2kg^{-2}$
$F = Gm_1m_2/d^2$
$= Gx10^3x10^3/(0.5)^2$
$=6.67x10^{-11}x10^6/0.25$
$= 26.7x10^{-11+6}$
$= 26.7x10^{-5}$
$= 2.67x10^{-4} N$

$m = m_1 = m_2 =?$ **5.2**
$F = 0.006673N$
$d = 1m$
$G = 6.67x10^{-11} Nm^2kg^{-2}$
$F = Gm_1m_2/d^2$
$m^2 = Fxd^2/G$
$= \dfrac{0.006673(1)^2}{6.673x10-11}$
$= \dfrac{6.673x10^{-3}}{6.673x10^{-11}}$
$m^2 = 1x10^{-3+11}$
  $= 10^8$
$\sqrt{m^2} = \sqrt{(10^4)^2}$
$m = 10000kg$

$M_m = 6.42x10^{23}kg$
$R_m = 3370km$ **5.3**
  $= 3.370x10^6m$
$G = 6.67x10^{-11} Nm^2kg^{-2}$
$g_m = GM_m/R^2$
$= \dfrac{6.673x10^{-11}x6.42x10^{23}}{(3.370x10^6)^2}$
$= \dfrac{42.84x10^{23-11}}{11.35x10^{12}}$
  $= 3.77x10^{12-12}$
  $= 3.77x10^0$
$g_m = 3.77m/s^2$
$g_m = 1.62m/s^2$ **5.4**
$R_m = 1740km$

Column 1:

$= 1.740 \times 10^6 m$

$G = 6.67 \times 10^{-11} Nm^2kg^{-1}$

$M_m = g_m R^2 / G$

$= \dfrac{1.62 \times (1.74 \times 10^6)^2}{6.673 \times 10^{-11}}$

$= \dfrac{1.62 \times 3.027 \times 10^{12}}{6.673 \times 10^{-11}}$

$= \dfrac{4.904712 \times 10^{12+11}}{6.673}$

$= 0.735 \times 10^{23}$

$M_m = 7.35 \times 10^{22} kg$

5.5 $h = 3600 km$

$= 3.6 \times 10^6 m$

$R = 6.4 \times 10^6 m$

$M_e = 6 \times 10^{24} kg$

$g_m = GM/(R+h)^2$

$= \dfrac{6.67 \times 10^{-11} \times 6 \times 10^{24}}{(6.4 \times 10^6 + 3.6 \times 10^6)^2}$

$= \dfrac{40.038 \times 10^{24-11}}{[(6.4+3.6) \times 10^6]^2}$

$= \dfrac{40.038 \times 10^{13}}{(10 \times 10^6)^2}$

$= \dfrac{40.038 \times 10^{13}}{100 \times 10^{12}}$

$= 0.4 \times 10^{13-12}$

$= 0.4 \times 10^1$

$g_m = 4 m/s^2$

5.6 $R = 48700 km$

$= 48.7 \times 10^6 m$

$g = GM/R^2$

$= \dfrac{6.67 \times 10^{-11} \times 6 \times 10^{24}}{(48.7 \times 10^6)^2}$

$= \dfrac{40.038 \times 10^{24-11}}{2371.69 \times 10^{12}}$

$= 0.017 \times 10^{13-11}$

$= 0.017 \times 10^1$

$g = 0.17 m/s^2$

5.7 $R = 10000 km$

$= 10^7 m$

$g = 4 m/s^2$

$M_e = gR^2/G$

$= \dfrac{4 \times (10^7)^2}{6.67 \times 10^{-11}}$

$= 0.599 \times 10^{14+11}$

$= 0.599 \times 10^{25}$

$M = 5.99 \times 10^{24} kg$

5.8 $g_h = \frac{1}{4} g$

$g_h = GM/(R+h)^2$

$(R+h)^2 = GM/g_h$

$= GM/\frac{1}{4} g$

$(R+h)^2 = 4GM/g$

دونوں طرف جذری

$\sqrt{(R+h)^2} = \sqrt{4GM/g}$

$R+h = \sqrt{4R^2}$

$R+h = 2R$

Column 2:

$h = 2R - R$

$h = R$

5.9 $h = 850 km$

$h = 0.85 \times 10^6 m$

$V_0 = (GM/R+h)^{1/2}$

$= \dfrac{(6.673 \times 10^{-11} \times 6 \times 10^{24})^{1/2}}{(0.85 \times 10^6 + 6.4 \times 10^6)^{1/2}}$

$= \dfrac{(40.038 \times 10^{13})^{1/2}}{[(0.85+6.4)10^6]^{1/2}}$

$= \dfrac{(40.038 \times 10^{13-6})^{1/2}}{(\quad 7.25 \quad)^{1/2}}$

$= (5.522 \times 10^7)^{1/2}$

$= (55.22 \times 10^6)^{1/2}$

$= 7.431 \times 10^3$

$V_0 = 7431 m/s$

5.10 $h = 42000 km$

$= 42 \times 10^6 m$

$V_0 = (GM/R+h)^{1/2}$

$= \dfrac{(6.673 \times 10^{-11} \times 6 \times 10^{24})^{1/2}}{(42 \times 10^6 + 6.4 \times 10^6)^{1/2}}$

$= \dfrac{(40.038 \times 10^{24-11})^{1/2}}{[(42+6.4)10^6]^{1/2}}$

$= \dfrac{(40.038 \times 10^{13-6})^{1/2}}{(\quad 48.4 \quad)^{1/2}}$

$= (0.8272 \times 10^7)^{1/2}$

$= (8.272 \times 10^6)^{1/2}$

$= 2.876 \times 10^3$

$V_0 = 2876 m/s$

CHAPPTER # 06
Exp: 1, 2, 3, 4, 5

6.1 $F = 300 N$

$d = 35 m$

$W = Fd$

$= 300 \times 35$

$= 10500 J$

6.2 $W = mg = 20 N$

$h = 6 m$

$P.E = mgh$

$= 20 \times 6$

$= 120 J$

6.3 $W = 12 kN$

$= 12000 N$

$V = 20 m/s$

$W = mg$

$m = W/g$

$= 12000/10$

$= 1200 kg$

$K.E = \frac{1}{2}mV^2$

$= \frac{1}{2} \times 1200 \times (20)^2$

$= 600 \times 400$

$= 240000$

$= 240 \times 10^3$

$= 240 kJ$

6.4 $m = 500 g$

$= 0.5 kg$

Column 3:

$V = 15 m/s$

$K.E = \frac{1}{2}mV^2$

$= \frac{1}{2} \times 500 \times (0.5)^2$

$= 0.5 \times 225/2$

$K.E = 56.25 J$

کنزرویشن آف انرجی کے قانون کے مطابق

$K.E = P.E$

$P.E = 56.25 J$

6.5 $h = 6 m$

$V = 1.5 m/s$

$m = 40 kg$

$P.E = mgh$

$= 40 \times 10 \times 6$

$= 2400 J$

$K.E = \frac{1}{2}mV^2$

$= \frac{1}{2} \times 40 \times (1.5)^2$

$= 20 \times 2.25$

$= 45 J$

6.6 $V = 4 m/s$

$F = 4000 N$

$P = W/t = F.d/t$

$P = F.V$

$= 4000 \times 4$

$= 16000 W$

$= 16 kW$

6.7 $F = 300 N$

$d = 50 m$

$t = 60 s$

$P = W/t = F.d/t$

$P = 300 \times 50/60$

$= 250 W$

6.8 $m = 50 kg$

$t = 20 s$

سیڑھ کی اونچائی $= 16 cm$

$16/100 = 0.16 m$

سیڑھیوں کی تعداد $= 25$

$h = 25 \times 0.16 = 4 m$

$P = W/t = mgh/t$

$= 50 \times 10 \times 4/20$

$= 100 W$

6.9 $m = 200 kg$

$h = 6 m$

$t = 10 s$

$P = W/t = mgh/t$

$= 200 \times 10 \times 6/10$

$= 1200 W$

6.10 $m = 800 kg$

$P = 1 hp = 746 W$

$t = 10 mint = 600 s$

$h = 15 m$

$P = W/t$

$W = P \times t$

$= 746 \times 600$

Column 4:

input $= 447600 J$

$W = mgh$

$= 800 \times 10 \times 15$

output $= 120000 J$

$E_f = (output/input)100$

$= \dfrac{120000}{447600} \times 100$

$E_f = 26.8\%$

CHAPPTER # 07
Exp: 1, 2

7.1 $m = 850 g$

$= 850/1000 = 0.85 kg$

$V = 40cm \times 10cm \times 5cm$

$= \dfrac{40m}{100} \times \dfrac{10m}{100} \times \dfrac{5m}{100}$

$= 0.4m \times 0.1m \times 0.05m$

$V = 0.002 m^3$

$\rho = m/V$

$= 0.85/0.002$

$= 425 kg/m^3$

7.2 $m = 1L = 1 kg$

$\rho = 0.92 kg/L$

$V = m/\rho$

$= 1/0.92 = 1.09 L$

7.3 (a) $m = 5 kg$

$\rho = 8200 kg/m^3$

$V = m/\rho = 5/8200$

$= 6.01 \times 10^{-4} m^3$

(b) $m = 200 g$

$= 200/1000 = 0.2 kg$

$\rho = 11300 kg/m^3$

$V = m/\rho = 0.2/11300$

$= 1.77 \times 10^{-5} m^3$

(c) $m = 0.2 kg$

$\rho = 19300 kg/m^3$

$V = m/\rho = 0.2/19300$

$= 1.04 \times 10^{-5} m^3$

7.4 $\rho = 1.3 kg/m^3$

$V = 8m \times 5m \times 4m$

$= 160 m^3$

$m = \rho \times V$

$= 160 \times 1.3$

$= 208 kg$

7.5 $F = 75 N$

$A = 1.5 cm^2$

$(1m)^2 = (100cm)^2$

$1/10^4 m^2 = 1 cm^2$

$1.5 cm^2 = 0.00015 m^2$

$P = F/A$

$= 75/0.00015$

$= 5 \times 10^5 Pa$

7.6 $L = 10 mm$

$= 10/1000 = 0.01 m$

$A = L \times L = 0.01 \times 0.01$

$= 1 \times 10^{-4} m^2$

$F = 20N$
$P = F/A = 20/10^{-4}$
$= 2 \times 10^5 N/m^2$

$m = 1000g = 1kg$ **[7.7]**
$A = 7.5cm \times 7.5cm$
$= \frac{7.5m}{100} \times \frac{7.5m}{100}$
$= 0.075m \times 0.075m$
$A = 0.005625 m^2$
$F = mg$
$= 1 \times 10 = 10N$
$P = F/A$
$= 10/0.005625$
$= 1778 N/m^2$

$V = \frac{20cm}{100} \times \frac{7.5cm}{100} \times \frac{7.5cm}{100}$
$= 0.2m \times 0.075m \times 0.075m$
$V = 0.001125 m^3$
$\rho = m/V$
$= 1/0.001125$
$= 888.89 kg/m^3$

کیوب کے ماس اور ڈنسٹی کے لحاظ سے
اس کا اصل والیوم **[7.8]**
$m = 306g$
$\rho = 2.55 g/cm^3$
$V_0 = m/\rho$
$= 306/2.55$
$= 120 cm^3$

کیوب کی شکل کی وجہ سے اس کا والیوم
$V_s = 5 \times 5 \times 5 = 125 cm^3$
کیویٹی کا والیوم $= V_c = V_s - V_0$
$V_c = 125 - 120 = 5 cm^3$

$W_{air} = 18N$ **[7.9]**
$W_{water} = 11.4N$
$D = (W_{air}/W_{air} - W_{wat})\rho$
$D = (18/6.6) \times 1000$
$= 2727 kg/m^3$ **(Al)**

$W = 3.06N$ **[7.10]**
$m = W/g = 3.06/10$
$= 0.306kg = 306g$
$\rho = 0.6 g/cm^3$
(a) $V = m/\rho$
$= 306/0.6 = 510 cm^3$
(b) $V = m/\rho$
$= 306/0.9 = 340 cm^3$

$F_2 = 20000N$ **[7.11]**
پریس کے پسٹن کا ایریا
$D = 30cm$
$R = D/2 = 30/2$
$= 15cm = 0.15m$
$A = \pi R^2$
$= 3.14 \times (0.15)^2$
$= 0.07065 m^2$

پمپ کے پسٹن کا ایریا
$d = 3cm$
$r = d/2 = 3/2$
$= 1.5cm = 0.015 m^2$
$a = \pi r^2$
$= 3.14 \times (0.015)^2$
$= 0.0007065 m^2$
$F_2/A = F_1/a$
$F_1 = F_2 \times a/A$
$= \frac{20000 \times 0.0007065}{0.07065}$
$F_1 = 14.13/0.07065$
$F_1 = 200N$

$A = 2 \times 10^{-5} m^2$ **[7.12]**
$F = 4000N$
اصل لمبائی $= L = 2m$
$\Delta L = 2mm$
$= 2/1000 = 0.002m$
$Y = F \times L/A \times \Delta L$
$= 4000 \times 2/2 \times 10^{-5} \times 0.002$
$= 8000/4 \times 10^{-8}$
$Y = 2 \times 10^{11} N/m^2$

CHAPPTER # 08
Exp: 1, 2, 3, 4

$C = 50^0 C$ **[8.1]**
$F = 1.8^0 C + 32$
$= 1.8 \times 50 + 32$
$F = 122^0 F$

$F = 98.6^0 F$ **[8.2]**
$C = (F-32)/1.8$
$= (98.6-32)/1.8$
$= 37^0 C$
$K = C + 273$
$= 37 + 273$
$= 310K$

$L_0 = 2m$ **[8.3]**
$T_1 = 0^0 C = 273K$
$T_2 = 20^0 C = 293K$
$\alpha = 2.5 \times 10^{-5} K^{-1}$
$\Delta L = \alpha L_0 (T_2 - T_1)$
$= 2.5 \times 10^{-5} \times 2(293-273$
$= 2.5 \times 10^{-5} \times 2(20)$
$= 2.5 \times 40 \times 10^{-5}$
$= 100/10^5$
$= 0.001m = 0.1cm$

$V_0 = 1.2 m^3$ **[8.4]**
$T_1 = 15^0 C = 288K$
$T_2 = 40^0 C = 313K$
$\beta = 3.67 \times 10^{-3} K^{-1}$
$V = V_0 (1 + \beta \Delta T)$
$= 1.2[1 + 3.67 \times 10^{-3}(313-288)]$
$= 1.2[1 + 3.67 \times 10^{-3}(25)]$
$= 1.2[1 + 0.09175]$
$V = 1.3 m^3$

$m = 0.5kg$ **[8.5]**
$T_1 = 10^0 C = 283K$
$T_2 = 65^0 C = 338K$
$C = 4200 J/kgK$
$\Delta Q = Cm\Delta T$
$= 0.5 \times 4200(338-283)$
$= 05 \times 4200 \times 55$
$\Delta Q = 115500J$

$\Delta Q = 1000J/s$ **[8.6]**
$m = 200g = 0.2kg$
$T_1 = 20^0 C = 293K$
$T_2 = 90^0 C = 363K$
$Q = Cm\Delta T/t$
$t = 4200 \times 0.2(363-293)/Q$
$t = 840(70)/1000$
$t = 58800/1000$
$t = 58.8s$

$\Delta Q = 50000J$ **[8.7]**
$H_f = 336000 K/kg$
$\Delta Q = H_f m$
$m = \Delta Q/H_f$
$m = 50000/336000$
$= 0.149kg$
$= 150g$

$m = 100g = 0.1kg$ **[8.8]**
برف کو گرم کرنے کے لیے درکار حرارت
$Q_1 = Cm\Delta T \ (-10 \to 0)$
$= 2100 \times 0.1[0-(-10)]$
$Q_1 = 2100J$
برف کو پگھلانے کے لیے درکار حرارت
$Q_2 = mH_f$ (@ $0^0 C$)
$= 0.1 \times 336000$
$Q_2 = 33600J$
پانی کو گرم کرنے کے لیے درکار حرارت
$Q_3 = Cm\Delta T \ (0 \to 10)$
$= 4200 \times 0.1(10-0)$
$Q_3 = 4200J$
کل حرارت $= Q_1 + Q_2 + Q_3$
$= 2100 + 33600 + 4200$
$Q = 39900J$

$T = 100^0 C$ **[8.9]**
$m = 100g = 0.1kg$
$H_v = 2.26 \times x 10^6 J/kg$
$\Delta Q = mH_v$
$= 0.1 \times 2.26 \times 10^6$
$= 2.26 \times 10^5 J$

$m_{steam} = 5g$ **[8.10]**
$= 5/1000 = 0.005kg$
$m_{water} = 500g$
$= 500/1000 = 0.5kg$
پانی کی پہلے ٹمپریچر سے آخری ٹمپریچر تک
اپنے ماس سے جذب کردہ حرارت

$Q_p = Cm\Delta T$
$= Cm(T_2 - T_1)$
$= 2100 \times 0.5(T_2 - 10)$
$= 2100T_2 - 21000$
ماس کے لحاظ سے بھاپ کی خارج کردہ حرارت
$Q = mH_v$
$= 0.005 \times 2.26 \times 10^6$
$= 11300J$
بھاپ کی پہلے ٹمپریچر سے آخری ٹمپریچر تک جاتے ہوئے خارج کردہ حرارت
$Q = Cm\Delta T$
$= 4200 \times 0.005(100 - T_2)$
$= Q = 2100 - 21T_2$
پانی کی جذب کردہ حرارت
بھاپ کی خارج کردہ حرارت
$2100T_2 - 2100 =$
$11300 + 2100 - 21T_2$
$2100T_2 + 21T_2 =$
$11300 + 2100 + 21000$
$2121T_2 = 34400$
$T_2 = 34400/2121$
$T_2 = 16.21^0 C$

CHAPPTER # 09
$A = 200 m^2$ **[9.1]**
$L = 20cm = 0.2m$
$T_1 = 15^0 C = 288K$
$T_2 = 35^0 C = 308K$
$k = 0.65 \ W/mK$
$Q/t = kA(T_2 - T_1)/L$
$= \frac{0.65 \times 200(308-288)}{0.2}$
$= 130 \times (20)/0.2$
$= 13000 J/s$

$A = 2 \times 2.5 = 5 m^2$ **[9.2]**
$L = 0.8cm = 0.008m$
$t = 1hr = 3600s$
$T_1 = 5^0 C = 278K$
$T_2 = 25^0 C = 298K$
$k = 0.8 \ W/mK$
$Q = kA(T_2 - T_1) \times t/L$
$= \frac{0.8 \times 5(298-278) \times 3600}{0.008}$
$= 4(20)3600/0.008$
$= 288000/0.008$
$= 36000000$
$Q = 3.6 \times 10^7 J$

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NUMERICAL:10

CHAPPTER # 10

Exp: 1, 2, 3

10.1

$T = 2s$

$g_e = 10m/s$

$g_m = g_e/6$

$= 10/6$

$= 1.67m/s$

$L = ?$

$T = 2\pi\sqrt{l/g}$

$T^2 = [2\pi\sqrt{l/g}]^2$

$T^2 = 4\pi^2 \times L/g$

$L = T^2 \times g/4\pi^2$

زمین کے لیے لمبائی

$L = (2)^2 10/4(3.14)^2$

$= 10/9.8596$

$= 1.02m$

چاند کے لیے لمبائی

$L = (2)^2 1.67/4(3.14)^2$

$= 1.67/9.8596$

$= 0.17m$

10.2

$L = 0.99m$

$T = 4.9s$

$T = 2\pi\sqrt{l/g}$

$T^2 = [2\pi\sqrt{l/g}]^2$

$T^2 = 4\pi^2 \times L/g$

$g = 4\pi^2 \times L/T^2$

$= 4(3.14)^2 \times 0.99/(4.9)^2$

$= 4(9.8596)(0.99)/24.01$

$g = 1.63m/s^2$

10.3

$L = 1m$

$g_e = 10m/s$

$g_m = 1.67m/s$

$T = 2\pi\sqrt{l/g}$

زمین کی سطح پر ٹائم پیریڈ

$T = 2(3.14)\sqrt{1/10}$

$= 6.28\sqrt{0.1} = 2s$

چاند کی سطح پر ٹائم پیریڈ

$T = 2(3.14)\sqrt{1/1.6}$

$= 6.28\sqrt{0.598}$

$= 4.9s$

10.4

$T = 2s$

$g = 10m/s^2$

$T = 2\pi\sqrt{l/g}$

$T^2 = [2\pi\sqrt{l/g}]^2$

$T^2 = 4\pi^2 \times L/g$

$L = T^2 \times g/4\pi^2$

$= (2)^2 \times 10/4(3.14)^2$

$= 4 \times 10/4 \times 9.85$

$= 40/39.4$

$L = 1.02m$

$t = 20s$ **10.5**

ویوز کی تعداد $= n = 100$

$\lambda = 6cm$

$= 6/100$

$= 0.06m$

$f =$ وقت/ویوز کی تعداد

$= n/t$

$= 100/20$

$= 5Hz$

$T = 1/f$

$= 1/5$

$= 0.2s$

$V = f\lambda$

$= 5 \times 0.06 = 0.3m/s$

10.6

$f = 12Hz$

$\lambda = 3cm$

$= 3/100$

$= 0.03m$

$V = f\lambda$

$= 12 \times 0.03$

$= 0.36m/s$

10.7

$f = 190Hz$

$S = 90m$

$t = 0.5s$

ٹائم پیریڈ **(a)**

$T = 1/f$

$T = 1/190$

$= 0.005s$

سپیڈ **(b)**

$V = S/t$

$V = 90/0.5$

$= 180m/s$

ویولینگتھ **(c)**

$V = f\lambda$

$\lambda = V/f$

$\lambda = 180/190$

$= 0.95m$

10.8

$f = 4.8Hz$

$\lambda = 6cm$

$= 0.06m$

سپیڈ **(a)**

$V = f\lambda$

$V = 4.8 \times 0.06$

$= 0.29m/s$

ٹائم پیریڈ **(b)**

$T = 1/f$

$T = 1/4.8$

$= 0.21s$

10.9

$f = 5Hz$

$\lambda = 40mm$

$= 40 \times 10^{-3}m$

$S = 80cm$

$= 80/100$

$= 0.8m$

$V = f\lambda$

$= 5 \times 40 \times 10^{-3}$

$= 0.2m/s$

$S = Vt$

$t = S/V$

$= 0.8/0.2$

$= 4s$

10.10

$f = 90MHz$

$= 90 \times 10^6 Hz$

$V = 3 \times 10^8 m/s$

$V = f\lambda$

$\lambda = V/f$

$= 3 \times 10^8/90 \times 10^6$

$= 3.33m$

CHAPPTER # 11

Exp: 2, 3

11.1

$I = 3 \times 10^{-6} W/m^2$

$I_0 = 10^{-12} W/m^2$

ساؤنڈ لیول **(a)**

$S.L = 10\log I/I_0 (dB)$

$= 10\log(3 \times 10^{-6}/10^{-12})$

$= 10\log(3 \times 10^6)$

$= 10[\log 3 + \log 10^6]$

$= 10[\log 3 + 6\log 10]$

$= 10[0.4771 + 6(1)]$

$= 64.771$

$= 64.8dB$

انٹینسٹی **(b)**

$S.L = 100dB$

$S.L = 10\log I/I_0 (dB)$

$100 = 10\log I/10^{-12}$

$10 = \log I/10^{-12}$

دونوں طرف انٹی لاگ لیا

$10^{10} = I/10^{-12}$

$10^{10} \times 10^{-12} = I$

$10^{-2} = I$

$I = 0.01W/m^2$

11.2

$S.L = 80dB$

$I_0 = 10^{-12} W/m^2$

$S.L = 10\log I/I_0 (dB)$

$80 = 10\log I/10^{-12}$

$8 = \log I/10^{-12}$

دونوں طرف انٹی لاگ لیا

$10^8 = I/10^{-12}$

$10^8 \times 10^{-12} = I$

$I = 10^{-4} W/m^2$

11.3

$V = 330m/s$

$\lambda = 5cm$

$= 5/100$

$= 0.05m$

$V = f\lambda$

$330 = f \times 0.05$

$f = 330/0.05$

$= 6.6 \times 10^3 Hz$

ساؤنڈ قابل سماعت ہے

11.4

ویوز کی تعداد $= n = 72$

$t = 60s$

فریکوئنسی **(a)**

$f =$ وقت/ویوز کی تعداد

$f = n/t$

$= 72/60$

$= 1.2Hz$

ٹائم پیریڈ **(b)**

$T = 1/f$

$= 1/1.2$

$= 0.83s$

11.5

$T = 1.5s$

$t = 1.5/2$

$= 0.75s$

$V = 1500m/s$

$S = Vt$

$= 1500 \times 0.75$

$= 1125m$

ٹائم صرف ایک طرف کا لیا جائے گا

11.6

$T = 5s$

$t = 5/2$

$= 2.5s$

$V = 346m/s$

$S = Vt$

$= 346 \times 2.5$

$= 865m$

ٹائم صرف ایک طرف کا لیا جائے گا

11.7

$T = 3.42s$

$t = 3.42/2$

$= 1.71s$

$V = 1531m/s$

$S = Vt$

$= 1531 \times 1.71$

$= 2618m$

ٹائم صرف ایک طرف کا لیا جائے گا

11.8

$V = 343m/s$

$f = 20000Hz$

بلند ترین فریکوئنسی کے لیے **(a)**

$V = f\lambda$

$343 = 20000 \times \lambda$

Column 1:

$\lambda = 343/20000$

$\lambda = 1.7 \times 10^{-2} m$

(b) کم ترین فریکوئنسی کے لیے

$V = f\lambda$

$343 = 20 \times \lambda$

$\lambda = 343/20 = 17.2 m$

$f = 2kHz$ | **11.9**

$= 2000 Hz$

$\lambda = 35cm$

$= 35/100$

$= 0.35m$

$S = 1.5km$

$= 1.5 \times 1000$

$= 1500m$

$V = f\lambda$

$= 2000 \times 0.35$

$= 700 m/s$

$S = Vt$

$t = S/V$

$= 1500/700$

$= 2.1s$

CHAPPTER # 12

Exp: 1, 2, 3, 4

$p = 10cm$ | **12.1**

$q = -5cm$

امیج مرر کے پیچھے، اس لیے نفی آیا

$1/f = 1/p + 1/q$

$= 1/10 + 1/(-5)$

$f = -10cm$

(diverging-mirror)

$HO = 30cm$ | **12.2**

$p = 10.5cm$

$f = 16cm$

$1/f = 1/p + 1/q$

$1/16 = 1/10.5 + 1/q$

$1/q = 1/16 - 1/10.5$

$= (10.5-16)/16 \times 10.5$

$1/q = -168/5.5$

$q = 30.54cm$

(converging-mirror)

HI: امیج کی اونچائی

HO: جسم کی اونچائی

$HI/HO = q/p$

$HI/30 = 30.54/10.5$

$HI = 87.26cm$

$p = 20cm$ | **12.3**

$HI/HO = q/p$

$HI/HI = q/p$

$1 = q/p$

$q = p = 20cm$

$1/f = 1/p + 1/q$

$= 1/20 + 1/20$

Column 2:

$f = 10cm$

$p = 34.4cm$ | **12.4**

$q = -5.66cm$

(diverging-mirror)

$1/f = 1/p + 1/q$

$= 1/34.4 + 1/(-5.66)$

$= (5.66-34.4)/34.4 \times 5.66$

$f = -194.7/28.74$

$= -6.77cm$

$f = -13.5cm$ | **12.5**

$q = -11.5cm$

$1/f = 1/p + 1/q$

$1/(-13.5) = 1/p + 1/(-11.5)$

$1/p = 1/11.5 - 1/13.5$

$= (13.5-11.5)/11.5 \times 13.5$

$p = 155.25/2$

$= 77.62cm$

$f = -8.70cm$ | **12.6**

$HO = 13.2cm$

$p = 19.3cm$

$p = 2p = 2(19.3)$

$= 38.4cm$

$1/f = 1/p + 1/q$

$1/(-8.70) = 1/19.3 + 1/q$

$1/q = 1/8.70 + 1/19.3$

$= (19.3-8.70)/8.70 \times 19.3$

$q = 167.91/10.6$

$= 15.84$

(b) امیج کی اونچائی

$HI/HO = q/p$

$I/13.2 = 16.84/19.3$

$HI = 10.8cm$

(c) امیج کی اونچائی

$HI/HO = q/p$

$I/13.2 = 15.84/38.4$

$HI = 5.42cm$

$R = 38cm$ | **12.7**

$f = R/2$

$= 38/2$

$= 19cm$

$p = 50cm$

$1/f = 1/p + 1/q$

$1/19 = 1/50 + 1/q$

$1/q = 1/19 - 1/50$

$= (50-19)/19 \times 50$

$q = 950/31$

$= 30.64cm$

امیج سیدھی ہوگی

$HO = 4cm$ | **12.8**

$p = 12cm$

$f = 8cm$

$1/f = 1/p + 1/q$

$1/8 = 1/12 + 1/q$

Column 3:

$1/q = (6-4)/48$

$q = 24cm$

(b) امیج کی اونچائی

$HI/HO = q/p$

$HI/4 = 24/12$

$HI = 8cm$

امیج، ریئل، الٹی، بڑی

$O = 10cm$ | **12.9**

$p = 20cm$

$f = -15cm$

$1/f = 1/p + 1/q$

$1/(-15) = 1/20 + 1/q$

$1/q = (-4-3)/60$

$q = -8.75cm$

$HI/HO = q/p$

$HI/10 = 8.75/20$

$HI = 4.28cm$

امیج، ورچوئل، سیدھی، بڑی

$f = 6cm$ | **12.10**

$q/p = 3/1$

$q = 3p = -3p$

$1/f = 1/p + 1/q$

$1/6 = 1/p + 1/(-3p)$

$p = 4cm$

$i = 35^0$ | **12.11**

$n = 1.25$

(a) اینگل آف ریفریکشن

$n = Sin i/Sin r$

$1.25 = Sin 35^0/Sin r$

$Sin r = 0.57/1.25$

$Sin r = 0.45$

$r = Sin^{-1}(0.45)$

$r = 27.32^0$

(b) کریٹیکل اینگل کے لیے

$n = Sin r/Sin i$

$1.25 = Sin 90^0/Sin C$

$Sin C = 1/1.25$

$Sin C = 0.80$

$C = Sin^{-1}(0.80)$

$= 53.13^0$

$P = 5D$ | **12.12**

$f = 1/P$

$= 1/5$

$= 0.2m$

میٹر کو سینٹی میٹر بنایا

$f = 20cm$

$q/p = 2/1$

$q = 2p$

$1/f = 1/p + 1/q$

$1/20 = 1/p + 1/2p$

Column 4:

$p = 30cm$

Exp: 1, 2

$Q = 100\mu C$ | **13.1**

$= 100 \times 10^{-6} C$

$= 10^{-4} C$

$e^- = 1.6 \times 10^{-19} C$

$Q = ne$

$n = Q/e$

$= 10^{-4}/1.6 \times 10^{-19}$

$= 0.625 \times 10^{-4+19}$

$n = 6.25 \times 10^{14}$

$q_1 = 10\mu C$ | **13.2**

$= 10 \times 10^{-6} C$

$= 10^{-5} C$

$q_2 = 5\mu C$

$= 5 \times 10^{-6} C$

$r = 150cm$

$= 150/100$

$= 1.5m$

$k = 9 \times 10^9 Nm^2/C^2$

$F = kq_1q_2/r^2$

$= \dfrac{9 \times 10^9 \times 10^{-5} \times 5 \times 10^{-6}}{(1.5)^2}$

$= 45 \times 10^{9-5-6}/2.25$

$F = 20 \times 10^{-2}$

$= 20/100$

$= 0.2N$

دفع کی فورس، ثبت چارجز

$F = 0.8N$ | **13.3**

$r = 0.1m$

$k = 9 \times 10^9 Nm^2/C^2$

$F = kq_1q_2/r^2$

$0.8 = 9 \times 10^9 \times q^2/(0.1)^2$

$q^2 = 0.8 \times 0.01/9 \times 10^9$

$= 8 \times 10^{-3}/9 \times 10^9$

$= 0.888 \times 10^{-12}$

$\sqrt{q^2} = \sqrt{0.88} \times \sqrt{(10^{-6})^2}$

$q = 0.942 \times 10^{-6}$

$= 9.42 \times 10^{-7} C$

$F = 0.1N$ | **13.4**

$r = 5cm$

$= 5/100$

$= 0.05m$

$k = 9 \times 10^9 Nm^2/C^2$

$F = kq_1q_2/r^2$

$q^2 = Fr^2/k$

$= 0.1 \times (0.05)^2/9 \times 10^9$

$= 0.1 \times 0.0025 \times 10^{-9}/9$

$q^2 = 2.8 \times 10^{-5} \times 10^{-9}$

$= 2.8 \times 10^{-14} C$

2cm کے لیے کولمب فورس

$r = 2cm$

$= 2/100$

Column 1:

$= 0.02m$

$q^2 = 2.8 \times 10^{-14} C$

$F = kq_1q_2/r^2$

$= \dfrac{9\times10^9 \times 2.8\times10^{-14}}{(0.02)^2}$

$= (25.2/0.0004)\times10^{9-14}$

$= 63000\times10^{-5}$

$F = 0.63N$

13.5

$V = 10^4V$

$q = 100\mu C$

$\quad = 100\times10^{-6}$

$\quad = 10^{-4}C$

$V = W/q$

$10^4 = W/10^{-4}$

$W = 10^4\times10^{-4}$

$\quad = 10^0$

$W = 1J$

13.6

$q = +2C$

$V_a = 100V$

$V_b = 50V$

$W = q(V_a - V_b)$

$\quad = 2(100-50)$

$\quad = 100J$

13.7

$V = 9V$

$Q = 0.06C$

$Q = CV$

$0.06 = 9 \times C$

$C = 0.06/9$

$\quad = 6.67\times10^{-3}F$

13.8

$Q_1 = 0.03C$

$V_1 = 6V$

$Q_2 = 2C$

مختلف ڈیٹا کے لیے بھی کیپیسی ٹینس وہی

رہے گی کیونکہ کیپیسٹر ایک ہی ہے

$C = C$

$Q_1/V_1 = Q_2/V_2$

$V_2 = Q_2V_1/Q_1$

$\quad = 2\times6/0.03$

$\quad = 400V$

13.9

$C_1 = 6\mu C$

$C_2 = 12\mu C$

$V = 12V$

$1/C_{eq} = 1/C_1 + 1/C_2$

$\quad = 1/6 + 1/12$

$\quad = 4\mu C$

سیریز میں تمام کیپیسٹرز پر چارج

ایک جیسا ہوگا

$Q = C_{eq}V$

$\quad = 4\times10^{-6}\times12$

$\quad = 48\times10^{-6}$

$\quad = 48\mu C$

$V_1 = Q/C_1$

$\quad = 48\times10^{-6}/6\times10^{-6}$

Column 2:

$= 8V$

$V_2 = Q/C_2$

$\quad = 48\times10^{-6}/12\times10^{-6}$

$\quad = 4V$

13.10

$C_1 = 6\mu C$

$C_2 = 12\mu C$

$V = 12V$

$C_{eq} = C_1 + C_2$

$\quad = 6+12$

$\quad = 18\mu F$

پیرالل میں ہر کیپیسٹر پر پوٹینشل ایک

جیسا ہوگا

$p.d = 12V$

$Q_1 = C_1V$

$\quad = 6\mu\times12$

$\quad = 72\mu C$

$Q_2 = C_2V$

$\quad = 12\mu\times12$

$\quad = 144\mu C$

CHAPPTER # 14

Exp: 1, 2, 6, 7

14.1

$I = 3mA$

$\quad = 3\times10^{-3}A$

$t = 1mints$

$\quad = 60s$

$I = Q/t$

$3\times10^{-3} = Q/60$

$Q = 60\times3\times10^{-3}$

$\quad = 180\times10^{-3}C$

14.2 (a) خشک جلد سے کرنٹ

$R = 100000\Omega$

$V = 12V$

$V = IR$

$12 = I \times 10^5$

$I = 12/10^5$

$\quad = 1.2\times10^{-4}A$

(b) گیلی جلد سے کرنٹ

$R = 1000\Omega$

$V = 12V$

$V = IR$

$12 = I \times 1000$

$I = 12/1000$

$\quad = 1.2\times10^{-2}A$

14.3

$R = 10M\Omega$

$\quad = 10\times10^6\Omega$

$V = 100V$

$V = IR$

$100 = I \times 10^7$

$I = 100/10^7$

$\quad = 1/10^5$

$\quad = 1/10^2\times10^3$

$\quad = (1/100)\times10^{-3}$

Column 3:

$= 0.01mA$

$V = 10V$

14.4

$I = 1.5A$

$t = 2mints$

$\quad = 120s$

$R = V/I$

$\quad = 10/1.5$

$\quad = 6.667\Omega$

$W = I^2Rt$

$= (1.5)^2\times6.667\times120$

$W = 1800J$

$R_1 = 2k\Omega$

14.5

$R_2 = 8k\Omega$

$V = 10V$

(a) $R_e = R_1 + R_2$

$\quad = 2+8$

$\quad = 10k\Omega$

(b) سیریز میں ہر رزسٹنس پر

کرنٹ ایک جیسا ہوگا؟

$V = IR_e$

$10 = I \times 10\times10^3$

$I = 1\times10^{-3}$

$\quad = 1mA$

(c)

$V_1 = IR_1$

$\quad = 1\times10^{-3}\times2\times10^3$

$\quad = 2V$

$V_2 = IR_2$

$\quad = 1\times10^{-3}\times8\times10^3$

$\quad = 8V$

$R_1 = 6k\Omega$

14.6

$R_2 = 12k\Omega$

$V = 6V$

(a)

$1/R_e = 1/R_1 + 1/R_2$

$\quad = 1/6 + 1/12$

$\quad = 4k\Omega$

(b) پیرالل میں ہر رزسٹنس کے

گرد پوٹینشل ایک جیسا ہوگا

$V = 6V$

(c)

$V = I_1R_1$

$6 = I_1 \times 6\times10^3$

$I_1 = 6/6\times10^3$

$\quad = 1mA$

$V = I_2R_2$

$6 = I_2 \times 12\times10^3$

$I_2 = 6/12\times10^3$

$\quad = 0.5mA$

$V = 220V$

14.7

$P = 100W$

گھنٹے $= 5h$

Column 4:

دن $= 30$

$t = 5\times30$

$\quad = 150h$

$P = VI$

$\quad = V(V/R)$

$P = V^2/R$

$100 = (220)^2/R$

$R = 48400/100$

$\quad = 484\Omega$

$E = P\times hours/1000$

$\quad = 100\times150/1000$

$\quad = 15kWh$

$P = 150W$

14.8

$R = 95\Omega$

$P = VI$

$\quad = V(V/R)$

$P = V^2/R$

$150 = V^2/95$

$V^2 = 150\times95$

$V^2 = 14250$

$\sqrt{V^2} = \sqrt{14250}$

$V = 120V$

14.9

10 بلبوں کے صرف شدہ یونٹس

$P = 10\times60 = 600W$

$t = 5\times30 = 150h$

$E_b = P\times h/1000$

$\quad = 600\times150/1000$

$\quad = 90kWh$

4 پنکھوں کے صرف شدہ یونٹس

$P = 4\times75 = 300W$

$t = 10\times30 = 300h$

$E_p = P\times h/1000$

$\quad = 300\times300/1000$

$\quad = 90kWh$

1 ٹی وی کے صرف شدہ یونٹس

$P = 1\times250 = 250W$

$t = 2\times30 = 60h$

$E_t = P\times h/1000$

$\quad = 250\times60/1000$

$\quad = 15kWh$

1 استری کے صرف شدہ یونٹس

$P = 1\times1000 = 1000W$

$t = 2\times30 = 60s$

$E_i = P\times h/1000$

$\quad = 1000\times60/1000$

$\quad = 60kWh$

$U_T = E_b + E_p + E_t + E_i$

$\quad = 90+90+15+60$

$\quad = 225kWh$

فی یونٹ قیمت $= Rs = 4$

بل $= 4\times225 = 1020/-$

Column 1

14.10

بلب کے لیے کرنٹ، رزسٹنس

$P = 100W$
$V = 250V$

(a)

$P = VI$
$100 = 250 \times I$
$I = 100/250 = 0.4A$

(b)

$V = IR$
$250 = 0.4 \times R$
$R = 250/0.4 = 625\Omega$

ہیٹر کے لیے کرنٹ، رزسٹنس

$P = 4kW = 4000W$
$V = 250V$

(a)

$P = VI$
$4000 = 250 \times I$
$I = 4000/250 = 16A$

(b)

$V = IR$
$250 = 16 \times R$
$R = 250/16 = 15.6\Omega$
$R = 5.6\Omega$

14.11

$V = 3V$
$I = 0.5A$

رزسٹر کے لیے پاور **(a)**

$P_r = I^2R$
$= (0.5)^2 \times 5.6$
$= 1.4W$

بیٹری کے لیے پاور **(b)**

$P_b = VI$
$= 3 \times 0.5$
$= 1.5W$

(c) کچھ پاور بیٹری کے اندر ونی

رزسٹنس کی وجہ سے ضائع ہو جاتی ہے

CHAPPTER # 15

Exp: 1

15.1

$V_p = 240V$
$V_s = 12V$
$N_p = 2000$
$N_s/N_p = V_s/V_p$
$N_s/2000 = 12/240$
$N_s = 12 \times 2000/240$
$= 100$

15.2

$N_p = 1$
$N_s = 100$ (step-up)
$V_p = 20V$
$N_s/N_p = V_s/V_p$
$100/1 = V_s/20$
$V_s = 100 \times 20/1$
$= 2000V$

Column 2

15.3

$N_p = 100$
$N_s = 1$ (step-down)
$V_p = 170V$
$I_p = 1mA = 1 \times 10^{-3}A$
$N_s/N_p = V_s/V_p$
$1/100 = V_s/170$
$V_s = 1 \times 170/100$
$= 1.7V$

ان پٹ پاور=آوٹ پٹ پاور

$V_sI_s = V_pI_p$
$1.7 \times I_s = 170 \times 1 \times 10^{-3}$
$I_s = 170 \times 10^{-3}/1.7$
$= 0.1A$

15.4

$V_p = 240V$
$V_s = 12V$
$N_p = 4000$
$I_s = 0.4A$
$N_s/N_p = V_s/V_p$
$N_s/4000 = 12/240$
$N_s = 12 \times 4000/240$
$= 200$

ان پٹ پاور=آوٹ پٹ پاور

$V_sI_s = V_pI_p$
$12 \times 0.4 = 240 \times I_p$
$I_p = 12 \times 0.4/240$
$= 0.02A$

15.5

$P = 500MW$
$= 500 \times 10^6W$
$V = 250kV$
$= 250 \times 10^3V$
$P = VI$
$500 \times 10^6 = 250 \times 10^3I$
$I = 500 \times 10^6/250 \times 10^3$
$= 2 \times 10^3A$

15.6

$P_{gen} = 150kW$
$= 150 \times 10^3W$
$V_{wire} = 10000V$
$R = 2\Omega$
$S = 5km$
$= 5000m$

تار میں پاور جنریٹر کی وجہ سے

$P_{gen} = P_{wire}$
$150 \times 10^3 = V_wI_w$
$150 \times 10^3 = 10000 \times I_w$
$I_w = 150 \times 10^3/10000$
$= 15A$

تار میں ضائع ہونے والا وولٹیج

ڈراپ

$V_d = I_w R$
$= 15 \times 2 = 30V$

تار میں ضائع ہونے والی پاور

$P_{loss} = V_d I_w$

Column 3

$= 30 \times 15 = 450W$

شہر کے ٹرانسار مر کو تارسے جو وولٹیج ملا

$V_T = V_{in} - V_d$
$= 10000 - 30$
$= 9970V$

CHAPPTER # 18

Exp: 1, 2, 4

18.1

$T_{1/2} = 7.3s$

آخری ہاف لائف تک دیا گیا عرصہ

$T_p = 29.2s$
$T_p = nT_{1/2}$
$29.2 = n \times 7.3$
$n = 29.2/7.3 = 4$
$N = N_0/2^n$
$= N_0/2^4$
$= N_0/16$

سولہ واں حصہ باقی رہ جائے گا

18.2

$T_{1/2} = 5.25Y$
$T_p = 26Y$
$T_p = nT_{1/2}$
$26 = n \times 5.25$
$n = 26/5.25 = 5$
$N = N_0/2^n$
$= N_0/2^5$
$= N_0/32$

بیتس واں حصہ باقی رہ جائے گا

18.3

$T_{1/2} = 5730Y$

$N_0 = $ اصل مقدار

$N = N_0/8 = $ باقی مقدار

$N = N_0/2^n$
$N_0/8 = N_0/2^n$
$1/8 = 1/2^n$
$2^3 = 2^n$
$n = 3$
$T_p = nT_{1/2}$
$= 3 \times 5730$
$= 17190$
$= 1.7 \times 10^4Y$

18.4

$T_{1/2} = 6h$
$T_p = 36h$
$T_p = nT_{1/2}$
$36 = n \times 6$
$n = 36/6 = 6$

$N_0 = $ اصل مقدار

$= 200mg$

$N = $ باقی مقدار

$N = N_0/2^n$
$= 200/2^6$
$= 200/64$
$= 3.12mg$

18.5

$T_{1/2} = 10mint$

Column 4

$N_0 = $ اصل مقدار

$= 368c/m$

$N = 23c/m = $ باقی مقدار

$N = N_0/2^n$
$23 = 368/2^n$
$2^n = 368/23$
$2^n = 16$
$2^n = 2^4$
$n = 4$
$T_p = nT_{1/2}$
$= 4 \times 10$
$= 40mint$

دو ہاف لائف کے بعد

18.6

$T_p = 4mint$
$T_p = nT_{1/2}$
$4 = 2 \times T_{1/2}$
$T_{1/2} = 4/2 = 2mint$

18.7

$T_{1/2} = 1500Y$

$N_0 = $ اصل مقدار

$= 32000c/m$

$N = N_0/16 = $ باقی مقدار

$N = N_0/2^n$
$N_0/16 = N_0/2^n$
$16 = 2^n$
$2^4 = 2^n$
$n = 4$
$T_p = nT_{1/2}$
$= 4 \times 1500$
$= 6000Y$

18.8

$T_{1/2} = 4000Y$
$t = 8h$
$C.R = 310, 300, 280, 270, 312, 305, 290$

کاونٹ ریٹ میں بے ترتیبی ظاہر کرتی

ہے کہ اس کی ہاف لائف چار ہزار سال

زیادہ ہے اور مشاہدہ کا ٹائم آٹھ گھنٹے

بہت کم ہے

18.9

$N_0 = $ اصل مقدار

$N = N_0/8 = $ باقی مقدار

$T_{1/2} = 5730Y$
$N = N_0/2^n$
$N_0/8 = N_0/2^n$
$1/8 = 1/2^n$
$8 = 2^n$
$n = 3$
$T_p = nT_{1/2}$
$= 3 \times 5730$
$= 17190Y$

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